What is claimed is:

1. A laser system with self-injection locking, the laser system comprising:

(a) a single frequency laser having a laser output for delivering laser light at a frequency $\omega_o$;

(b) a modulator coupled to the output of the laser for generating two sidebands, the modulator being driven by a RF signal at a frequency $\omega_m$;

(c) a filter coupled to an output of the modulator for suppressing or passing one of the two sidebands; and

(d) an optical path coupling an output of the filter to the laser for injection locking.

2. The laser system with self-injection locking of claim 1 wherein the modulator is coupled to the laser via an optical coupler whereby the modulator receives a portion of the laser's output.

3. The laser system with self-injection locking of claim 2 wherein the modulator is a Mach-Zehnder modulator.

4. The laser system with self-injection locking of claim 2 wherein the modulator is an accousto-optic modulator.

5. The laser system with self-injection locking of claim 2 wherein the modulator is an electro-optic modulator.

6. The laser system with self-injection locking of claim 1 wherein the filter suppresses one of the two sidebands and leaves the other sideband substantially unattenuated.

7. The laser system with self-injection locking of claim 1 wherein the laser is a distributed feedback laser.

8. The laser system with self-injection locking of claim 1 wherein the modulator produces carrier suppressed sidebands.

9. The laser system with self-injection locking of claim 1 wherein the filter suppresses any carrier produced by the modulator.

10. The laser system with self-injection locking of claim 1 wherein the filter is a Bragg Fiber Grating.

11. A method of enhancing the modulation bandwidth of a distributed feedback laser, the distributed feedback laser having a operating frequency and having an output and an input, the method comprising the steps of:

(a) tapping the output from the distributed feedback laser to thereby define a tapped optical signal;

(b) shifting the frequency of the tapped optical signal to thereby define a shifted optical signal;

(c) feeding the shifted optical signal back into the input of the distributed feedback laser.

12. The method of claim 11 wherein a Surface Acoustic Wave (SAW) device is used to shift the frequency of the tapped optical signal.

13. The method of claim 11 wherein an optical modulator device is used to shift the frequency of the tapped optical signal.

14. The method of claim 13 wherein the modulator is a Mach-Zehnder modulator.

15. The method of claim 13 wherein the shifting step includes suppressing unwanted

frequencies.

16. The method of claim 15 wherein a Bragg Fiber Grating filter is used to suppress the unwanted frequencies further.

17. The method of claim 11 wherein the step of feeding the shifted optical signal back into the input includes suppressing unwanted frequencies.

18. The method of claim 17 wherein a Bragg fiber grating is used to suppress the unwanted frequencies.

19. A laser system with self-injection locking, the laser system including:

(a) a laser having a laser output at a frequency $\omega_o$;

(b) an optical port providing a portion of said laser output at said port;

(c) a modulator coupled to the port, the modulator generating two sidebands, the modulator being driven by a RF signal at a frequency $\omega_m$;

(d) a filter coupled to an output of the modulator for suppressing one of the two sidebands and leaving the other sideband essentially unattenuated; and

(e) an optical path coupling an output of the filter to the laser for injection locking.

20. The laser system with self-injection locking of claim 19 wherein the modulator generates two carrier-suppressed sidebands.

21. The laser system with self-injection locking of claim 19 wherein the filter is a Bragg Fiber Grating.

22. The laser system with self-injection locking of claim 19 wherein the optical port is provided by an optical coupler connected to receive the laser output.

23. A laser system with self-injection locking, the system including a laser having a laser output at a frequency $\omega_o$; an optical port providing a portion of the laser output at the port; a modulator, coupled to the port, driven by a RF signal at a frequency $\omega_m$ to generate two sidebands at $\omega_o \pm \omega_m$; a filter coupled to the modulator for passing or suppressing one of the two sidebands of the signal $\omega_o \pm \omega_m$; and an optical path for coupling an output of the filter to the laser for injection locking the laser.

24. The laser system of claim 23 wherein the modulator produces the signal $\omega_o \pm \omega_m$ as a carrier suppressed signal.

25. The laser system of claim 23 wherein the modulator produces the signal $\omega_o \pm \omega_m$ as a signal with a carrier and said two side bands and wherein said filter suppresses said carrier and one of said two sidebands.

26. The laser system of claim 23 wherein the optical path includes at least one fiber optic cable.

27. The laser system of claim 23 wherein the filter is is a Bragg Fiber Grating.

28. The laser system of claim 23 wherein the optical path includes a portion of free-space.